

Md Abu Jaher Nayeem

International Centre for Diarrheal Disease Research, Bangladesh (icddr,b), Bangladesh

Md Abu Jaher Nayeem is a Research Officer at Gut-Brain Axis Laboratory, Infectious Diseases Division (IDD), icddr,b. He holds a Bachelor's and Master's degree in Biochemistry and Molecular Biology from the University of Dhaka. His academic journey has been marked by a relentless pursuit of scientific understanding and innovation.

During his tenure as an MSc student, his passion for research flourished under the mentorship of Dr. Zhahirul Islam, a renowned figure in the field of autoimmune neurological disease. His Master's thesis, a culmination of rigorous investigation, centred on the comprehensive analysis of the lipo-oligosaccharide region of *Campylobacter jejuni*, employing state-of-the-art techniques such as whole genome sequencing. This endeavour not only showcased academic prowess but also laid the foundation for his subsequent endeavours in the realm of molecular biology and bioinformatics. Nayeem seamlessly integrated into the Gut-Brain Axis Laboratory at icddr,b, where he undertook a pivotal role in advancing the development of bioinformatics pipelines tailored for the analysis of bacterial whole genome and metagenomic data. His proficiency in navigating the complexities of data analysis and interpretation proved instrumental in advancing the laboratory's research objectives. Nayeem's professional ethos is characterized by ambition and dynamism, traits that have positioned him as research enthusiastic within the scientific community. Driven by a relentless commitment to excellence, he remains steadfast in his pursuit of knowledge, recognizing diligent work as the sole pathway to social advancement. As an ambitious young scientist, Nayeem is poised to make significant contributions to the field of infectious diseases and beyond. His unwavering dedication to scientific inquiry, coupled with his interdisciplinary expertise, renders him a valuable asset to the scientific community. Through his continued endeavours to push the boundaries of scientific understanding ultimately strives to make meaningful contributions towards addressing global health challenges.

Project

Dysregulation of gut microbiota and mycobiota in patients with chronic diarrhoea: A pilot study

Chronic diarrhoea presents a significant global health burden, particularly in regions like South Asia and sub-Saharan Africa, where diarrhoeal diseases claim approximately 800,000 lives annually. While extensive research has elucidated the role of bacterial dysbiosis in chronic diarrhoea, the contribution of the mycobiome remains underexplored. Fungal infections, especially among patients undergoing prolonged antibiotic use, present critical risk factors for chronic diarrhoea, yet data on the prevalence of fungal diversity among hospitalized patients in Bangladesh is limited. The gut microbiome, including bacteria and fungi, maintains intestinal homeostasis and impacts physiological processes. Dysbiosis within this microbial community, triggered by factors such as antibiotic use or dietary changes, can lead to the overgrowth of pathogenic bacteria and fungi, disrupting normal digestive function and compromising the host's immune response. Understanding the intricate cross-talk between bacteria and fungi within the gut is essential for addressing and managing chronic diarrhoeal conditions effectively. **This proposed pilot study aims to characterize the mycobiome in the gut of patients experiencing chronic diarrhoea and investigate its correlation with alterations in the bacterial microbiome.** Through a prospective case-

controlled study involving 25 patients with chronic diarrhoea and 25 healthy controls, the study will assess the abundance and diversity of gut bacterial and fungal communities. Laboratory experiments will be conducted to analyze the V4 region of bacterial 16S rRNA and ITS2 sequences, with data processed using QIIME2-DADA2-based methods. The findings of this exploratory research are expected to generate hypotheses and pave the way for novel initiatives aimed at uncovering valuable insights into the integrated diversity of gut microbiota and fungi in chronic diarrhoea. Future research endeavors, including expanding sample sizes, employing advanced sequencing methods, and conducting longitudinal studies, hold the potential to enhance our understanding of gut microbiome and mycobiome dynamics, leading to targeted interventions and personalized treatments for chronic diarrhoea and advancements in gut health research.